

What is claimed is:

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1. A substrate processing apparatus, comprising:

a substrate processing chamber for processing a substrate;

5 a load lock chamber;

gas supply means for supplying gas into said load lock chamber;

exhaust means for exhausting said load lock chamber;

10 a moving mechanism provided in said load lock chamber and capable of moving said substrate;

local exhaust means capable of locally exhausting a dust generating portion of said moving mechanism; and

15 a flow rate controlling device provided in at least one of said gas supply means, said exhaust means and said local exhaust means.

2. A substrate processing apparatus as recited in claim 1, further comprising a control device and a pressure detecting device for detecting pressure in said load lock chamber, wherein

20 said flow rate control device is provided in at least said gas supply means, and

said control device is capable of controlling said flow rate control device in accordance with a signal from said pressure detecting device.

25 3. A substrate processing apparatus as recited in claim 1, wherein said flow rate control device is provided in at least

said local exhaust means.

4. A substrate processing apparatus as recited in claim 1, wherein said flow rate control device is provided in at least said exhaust means.

5 5. A substrate processing apparatus as recited in claim 4, wherein said exhaust means includes an atmospheric vent line, pressure at one end of said atmospheric pressure vent line is substantially equal to the atmospheric pressure, and the other end of said atmospheric pressure vent line is communicated with the inside of said load lock chamber, and

10 said flow rate control device is disposed in at least said atmospheric pressure vent line.

15 6. A substrate processing apparatus as recited in claim 3, further comprising a control device and a pressure detecting device for detecting pressure in said load lock chamber, wherein

said control device is capable of controlling said flow rate control device in accordance with a signal from said pressure detecting device.

20 7. A substrate processing apparatus as recited in claim 1, wherein said exhaust means includes an atmospheric pressure vent line and a vacuum exhaust line which is to be connected to a vacuum pump,

pressure at one end of said atmospheric pressure vent line is substantially equal to the atmospheric pressure and the

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other end is communicated with said load lock chamber, and
said local exhaust means is connected to said vacuum
exhaust line.

5 8. A substrate processing apparatus as recited in claim
1, wherein said exhaust means includes an atmospheric pressure
vent line and a vacuum exhaust line which is to be connected to
a vacuum pump,

10 pressure at one end of said atmospheric pressure vent
line is substantially equal to the atmospheric pressure and the
other end is communicated with said load lock chamber, and

said substrate processing apparatus further includes a
first valve disposed at an intermediate portion of said vacuum
exhaust line, a second valve disposed at an intermediate portion
of said atmospheric pressure vent line and a control device, and

15 said first and second valves is controlled by said
control device such that during the movement of said substrate
by utilizing said moving mechanism, said first valve is closed
and said second valve is opened.

20 9. A substrate processing apparatus as recited in claim
8, wherein said local exhaust means is connected to said vacuum
exhaust line at the downstream side of said first valve.

10. A substrate processing apparatus as recited in claim
8, further comprising a pressure detecting device for detecting
pressure in said load lock chamber, wherein

25 said gas supply means and said local exhaust means are

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respectively provided with said flow rate control devices,

during movement of said substrate by utilizing said moving mechanism, an amount of gas supplied by said gas supply means into said load lock chamber is controlled, by said flow rate control device, to be greater than an exhaust amount from said local exhaust means, and the gas supplied by said gas supply means is exhausted by said local exhaust means and said exhaust means.

11. A substrate processing apparatus as recited in claim 8, further comprising a pressure detecting device for detecting pressure in said load lock chamber, wherein

during movement of said substrate by utilizing said moving mechanism, said control device controls said flow rate control device in accordance with a signal from said pressure detecting device so as to keep the inside of said load lock chamber at a higher pressure level than the atmospheric pressure.

12. A substrate processing apparatus, comprising:

a substrate processing chamber for processing a substrate;

a load lock chamber;

gas supply means for supplying gas into said load lock chamber;

exhaust means for exhausting said load lock chamber;

a moving mechanism provided within said load lock chamber and capable of moving said substrate;

local exhaust means capable of locally exhausting a dust generating portion of said moving mechanism; and

a flow rate measuring device for measuring an exhaust amount of said local exhaust means.

5 13. A substrate processing apparatus as recited in claim 12, wherein said local exhaust means is provided in plural, and said flow rate measuring devices are respectively provided in each of said plurality of local exhaust means.

10 14. A substrate processing apparatus as recited in claim 12, wherein said local exhaust means comprises a flexible exhaust pipe.

15 15. A substrate processing apparatus, comprising:
a substrate processing chamber for processing a substrate;

a load lock chamber;
gas supply means for supplying gas into said load lock chamber;

20 exhaust means for exhausting said load lock chamber;
a moving mechanism provided within said load lock chamber and capable of moving said substrate;

a first vacuum exhaust line to be connected to a vacuum pump;

25 a second vacuum exhaust line which is communicated with said substrate processing chamber and said first vacuum exhaust line;

local exhaust means which is capable of locally exhausting a dust generating portion of said moving mechanism, and is communicated with said first vacuum exhaust line;

a valve connected to an intermediate portion of said local exhaust means; and

control means capable of controlling said valve;

wherein during processing of said substrate in said substrate processing chamber, said control means controls said valve to be closed.

16. A substrate processing apparatus as recited in claim 15, further comprising a third vacuum exhaust line which is communicated with said load lock chamber and said first exhaust line, and a second valve provided at an intermediate portion of said third vacuum exhaust line, wherein

said control means is also capable of controlling said second valve, and

during processing of said substrate in said substrate processing chamber, said control means controls said second valve to be closed.

17. A substrate processing apparatus as recited in claim 1, wherein said gas supply means is communicated with said load lock chamber at the side of region in which said substrate moves, and said exhaust means is communicated with said load lock chamber at the side of region in which said moving mechanism is provided.

18. A substrate processing apparatus as recited in claim 17, further comprising a partition plate provided in said load lock chamber for partitioning said load lock chamber into the region in which said substrate is moved and the region in which said moving mechanism is provided, and a slit provided in said partition plate, wherein

gas supplied, by said gas supply means, into the region in which said substrate is moved, is made to be flowed into the region in which said moving mechanism is provided.

19. A substrate processing apparatus as recited in claim 1, wherein said load lock chamber is coupled to said substrate processing chamber.

20. A substrate processing method, using a substrate processing apparatus comprising:

a substrate processing chamber for processing a substrate;

a load lock chamber;

gas supply means for supplying gas into said load lock chamber;

exhaust means for exhausting said load lock chamber;

a moving mechanism provided within said load lock chamber and capable of moving said substrate;

local exhaust means capable of locally exhausting a dust generating portion of said moving mechanism; and

a flow rate control device provided in at least one of

said gas supply means, said exhaust means and said local exhaust means;

said substrate processing method comprising the steps of:

moving said substrate by utilizing said moving mechanism,
5 while controlling pressure within said load lock chamber by
supplying gas into said load lock chamber by said gas supply
means, locally exhausting said dust generating portion by said
local exhaust means, exhausting said gas within said load lock
chamber by said exhaust means, and controlling flow rate of at
least one of said gas supply means, said exhaust means and said
local exhaust means by means of said flow rate control device;
and

processing said substrate in said substrate processing
chamber.

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15 21. A substrate processing method as recited in claim 20,
wherein said load lock chamber is coupled to said substrate
processing chamber, and

said step for moving said substrate is a step for moving
said substrate between said substrate processing chamber and said
20 load lock chamber by utilizing said moving mechanism.

22. A substrate processing method as recited in claim 20,
wherein said exhaust means includes an atmospheric vent line,
pressure at one end of said atmospheric vent line being
substantially equal to the atmospheric pressure and the other end
25 thereof being communicated with said load lock chamber, and

said step for moving said substrate is a step for moving said substrate while controlling the pressure within said load lock chamber greater than the atmospheric pressure.

5 23. A substrate processing method as recited in claim 20, wherein said step for moving said substrate is a step for moving said substrate while measuring the flow rate of said local exhaust means.

10 24. A substrate processing method as recited in claim 23, wherein said local exhaust means is provided in plural, said flow rate measuring devices are respectively provided in each of said plurality of local exhaust means, and

said step for moving said substrate is a step for moving said substrate while measuring flow rates of all of said plurality of local exhaust means.

15 25. A substrate processing method as recited in claim 20, wherein said local exhaust means comprises a flexible exhaust pipe.

20 26. A substrate processing method as recited in claim 20, wherein said substrate processing apparatus further comprising a first vacuum exhaust line to be connected to a vacuum pump, and a second vacuum exhaust line which is communicated with said substrate processing chamber and said first vacuum exhaust line, wherein

said local exhaust means is communicated with said first

vacuum exhaust line, and

5 said step for processing said substrate in said substrate processing chamber, is a step for processing said substrate in said substrate processing chamber, while exhausting said substrate processing chamber by said first and second vacuum exhaust lines and controlling pressure within said substrate processing chamber, without exhausting by said local exhaust means through said vacuum pump.

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